The following has been taken PRH (Lofty) Watson's excellent book "It's Nothing To Do With Me, I'm Radar. (Note 1) Part of the chapter "Naval Wireless Developments (Post WW1)", has been edited to include references to Belconnen only.

From page 91 ……The original proposal for a major RAN W/T station network had arisen back in 1924. Procrastination had reigned all those years, but who in government had been watching Germany, and indeed also Japan's excursions into China, all these subsequent years? At least the Naval Board was thoroughly aware of the strategic needs in this respect.

Land was finally chosen at Canberra, on the Canberra-Queanbeyan main road for the Receiving Station, away from any man made electrical interferrence. This became, eventually, HMAS Harman Naval Radio Station, named egotistically by and from part of the surnames of two naval commanders of that time. The site chosen for the transmitting station was near the commercial and ABC MF broadcast transmitter sites at Belconnen, in the vast open spaces of Canberra's paddocks, then totally, and exclusively, inhabited by sheep. Today (note 2), a spreading dormitory suburb and shopping complex occupies almost up to the doors of these transmitter positions. The then positioning of the transmitter and receiver stations approximately 18 kilometres apart gave the receiving station's operators a chance to hear distant calling stations and ships, without their receiver sets being swamped by their own powerful local transmitters.

As Canberra was to be the main W/T station, Belconnen was eventually fitted with the high power (200Kw) low frequency (44 KHz) transmitter that was to become the main Navy broadcast service, known as "Bels Broadcast". The aerial for this LF service was supported by three 600 feet steel masts, suitably guyed at each 200 feet level.This low frequency choice was made following the success of the low frequency service from Rugby (England) on 16 KHz. The lower the broadcasting frequency, the greater the ground wave, and consequently the greater the area covered.

The station also held many medium power HF transmitters which were used for ship/shore two way services, and for international naval circuits throughout the then "Empire". The main Bels broadcast was also transmitted on the HF band.

All output was normally in Morse code, the texts properly and purposedly coded according to the circumstances. In the late 1940s a gradual move to Frequency Shift Kying was commenced, and thereby Radio Teletype (RTT) was introduced to all RAN ships as the appropriate receiving equipment became available.

Although good Naval Telegraphists were able to read Morse up to 30 words a minute, the main Bels broadcast was usually sent at only a 16

WPM rate on the well established theory that “every ship will be able to read it at that speed” whereas being clever and efficient by transmitting at 25 WPM will inevitably result in every second ship requesting “repeats” due to their poor reception conditions, to say nothing of trying to write down and concentrate on a fast transmission whilst holding on to a bucket between your knees , courtesy of a belligerant seaway,

The excellent choice of this low frequency for Bels was proven time and time again, with good coverage over a very large patch of the world’s oceans. Some RAN ships even read Bels whilst in the Mediterranean Sea. Post WW2 (1947), when the cruiser “Australia” was despatched to Heard Island, in the Antarctic, to rescue the seriously ill station doctor (suffering from acute appendicitis) the only workable frequency between that ship and Canberra was found to be the LF band, so the Bels broadcast was suspended and two way ship/shore signals were passed on the high powered LF transmitterfor that emergency, proving once more the the worth of that particular band. In fact, LF is the optimum band for communicating with submerged submarines, witness the US Navy’s LF communications facility at NW Cape, which has a primary function in broadcasting to the United Statyes Navy’s world wide patrol of nuclear submarines.

Incidentally, the problem of doctors getting appendicitis when in a remote inaccessible Antarctic location was solved by making all future Antarctic-bound doctors subject to an appendectomy before departure.

The major transmitters eventually fitted at Canberra were all manufactured in Australia either by AWA or STC, and provided excellent service. Because of the high power generated by by the 200 Kw Belconnen STC manufactured LF transmitter, the output stage valves were, in fact, water cooled.

The fixed W/T circuits established throughout the Empire from Canberra included Columbo, Whitehall, Wellington, Canada, South Africa, Hong Kong and Singapore. Most of these were coducted in ordinary speed Morse code, but some were high speed Morse code at speeds of up to 200 WPM. These signals were controlled by means of the Morse code first being processed on punched paper tape, then playing the tape at the higher speed to key the transmitter.

Belconnen’s transmitters had a reasonable choice of aerial types which could be switched between certain transmitters according to the type of service required. For instance, many of the fixed overseas services were via Rhombic aerial arrays which had a very directional beam, but occupied a large amount of real estate. The Whitehall service was one of several which had a choice of “short route” or “long route”, this necessitating a changeover of the signal feed from one end to the other of the array. This change often necessitated operating a rope controlled Change Over Switch situated on the aerial poles way out in the paddocks.

The choice of direction for this service rested with the operator at Harman, in association with the receiving station's response on the signal strength and readability. The dual direction choice referred to the signal path around the earth, ie "long route" or "short route".

There were many times when the request "Change route for Whitehall" meant a wander throught the Belconnen dark, and the snow, to find this rope operated C.O.S., not an occasion to be relished during Canberra's bitter winter nights. Plus the need to find the darkened station on return.

Initially, this shore W/T equipment was maintained and operatedby the Telegraphist Section of the Communications Branch, as was usual with sea-going hardware. With the 1942 introduction of the new Wireless Mechanic rate, later called Radio Mechanic, properly trained maintenance staff became available, and some graduating Radio Mechanics were drafted to the two main W/T shore stations (note 3), as well as to ships.

This was not a move universally welcomed by the long term entrenched PO and CPO Telegraphists who, up till then, had carried the maintenance workload, and who keenly preserved their domain. In fact, newly graduated Radio Mechanics were not welcomed on certain ships either, where they had been drafted to maintain RDF (note 4) and W/T equipment.

A common greeting from the senior PO or CPO Telegraphist was "You look after the RDF, I'll look after the W/T", and "Don't you ever try and enter the W/T office, we look after our own gear on this ship"

In other words, petty departmental jealosy raised its head, so newly arrived Radio Mechanics on many ships were left to basically concentrate on their radar maintenance duties, this being a new technical art form and therefore no one's previous petty domain was being invaded.

Later on during the WW2 period of the 1940s, the W/T stations established at Darwin and Canberra were manned by a newly formed non-seagoing section of the Communications Branch called the Shore Wireless Service (SWS), which was staffed from older Communications Division members, many of whom were medically unfit for sea service. During the WW2 era WRAN Telegraphists were also recruited for shore W/T jobs, and they pulled their weight alongside their male opposite numbers at Harman, until the WRAN service was abandoned in 1948. Then in 1950, the WRANs were reintroduced into the RAN being administered separately from the male RAN. So their involvement in communications continued until, by the 1980s, the female communicators were integrated completely with the RAN, as are all female sailors today.

Members of the SWS continued to man Canberra and Darwin stations for

some period following the conclusion of WW2, but they gradually faded away as their engagement periods expired.

From 1947, freshly trained Radio Mechanics became available for these shore and sea going maintenance duties, and it was, by then, recognied by the Communications Division that the maintenance role, both seagoing and shore, was logically the domain of the RM who was specifically trained for these positions, so their presencee was finally accepted.

At the time of writing (note 2), the high power low frequency Belconnen transmitter , which had kept Australia's ships at sea so well informed over the many years since 1939 with a reliable signal service is no more. The RAN decided to stop manning the Belconnen station in 1996, and so contracted out the watch-keeping and maintenance duties for the remaining HF services to a private contractor, Namely Rockwell Australia, a subsidiary of the US company.

The LF component of the Bels broadcast now radiates from the previously USN owned complex of North West Cape in Western Australia, where that base continues to provide a high power LF (20 KHz) transmission, so the old proven virtue of LF transmission is continuing, but now from this RAN operated (since 1992) base, where the RAN is combined with a Defence Industries base contractor involvement

NOTES

1. Lofty was one of the early immediate post WW2 trainee Radio Mechanics tobe trained at the South Australian School of Mines, (now part of the University of South Australia) in 1946. See George Stevens book "Royal Australian Navy Radio Mechanics, A History of the Torrens Era" for more details.
2. 1988.
3. These were Belconnen and "Coonawarra" at Darwin.
4. Radio Direction Finding, later called Radar.